

Governor's Water Augmentation, Innovation, and Conservation Council Post-2025 AMAs Committee June 22, 2021



Agenda

- I. Welcome and Overview of Solutions Phase for the Committee
- II. ADWR Presentation on Groundwater in the Assured Water Supply (AWS) Program
 - *Ayesha Vohra and Jeff Inwood, ADWR*
 - a. Background and Perspective on the AWS Program
 - b. Pinal Active Management Area “Case Study”
- III. Discussion of Potential Concepts to Strengthen the AWS Program
- IV. Next Steps
- V. Adjournment

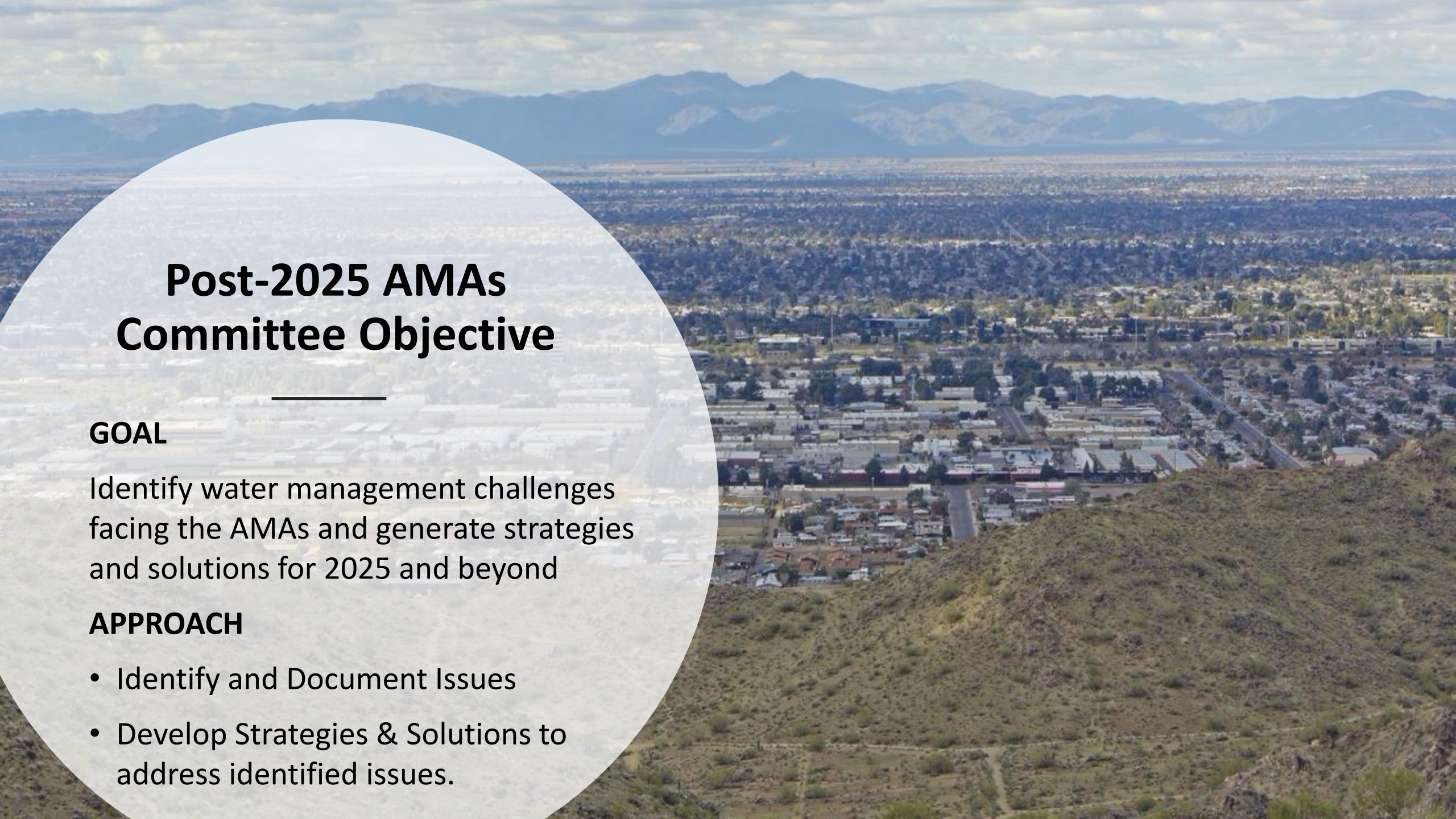


Webinar Logistics

- Please state your name when speaking.
- Mute yourself when not speaking.
- Indicate you wish to speak by typing your name in the chat box, and you will be invited to unmute and speak.
- Please message “Everyone” in the chat.
- The meeting and chat will be recorded.

Technical issues? Send a **direct message** to **ADWR-Host** in the chat, call the ADWR Help Desk at 602-771-8444 or email tickets@azwater.gov.



An aerial photograph of a city, likely Phoenix, Arizona, with a vast desert landscape and mountains in the background. The city is densely packed with buildings and trees, and the mountains are visible in the distance under a cloudy sky. A large, semi-transparent white circle is overlaid on the left side of the image, containing the text.

Post-2025 AMAs Committee Objective

GOAL

Identify water management challenges facing the AMAs and generate strategies and solutions for 2025 and beyond

APPROACH

- Identify and Document Issues
- Develop Strategies & Solutions to address identified issues.



Identified Water Management Issues

- Hydrologic Disconnect
- Exempt Wells
- Unreplenished Groundwater Withdrawals
- Groundwater in the Assured Water Supply Program
- Water Supplies for Replenishment of the CAGR
- Post-2025 AMAs Management Structure



Phase Two: Develop Strategies & Solutions

OBJECTIVES

- Identify solutions that can be implemented within the next year and a half
- Identify broader strategies to create momentum to pursue with subsequent administration

An aerial photograph of a town, likely Flagstaff, Arizona, showing a mix of residential and commercial buildings, a large green field, and a baseball park. The town is surrounded by dense green forests and mountains in the background under a blue sky with some clouds. A semi-transparent circular overlay is on the left side of the image, containing text.

Initial Focus Issues

- **Hydrologic Disconnect**
- **Unreplenished Groundwater Withdrawals**
- **Groundwater in the Assured Water Supply Program**
- Exempt Wells
- Water Supplies for Replenishment of the CAGR
- Post-2025 AMAs Management Structure

A scenic view of a desert landscape. In the foreground, there are various desert plants, including tall saguaros and cholla. A large body of water, likely a reservoir, is visible in the middle ground, surrounded by mountains. The sky is blue with some light clouds.

Remaining Issues

- **Exempt Wells** – Prescott AMA stakeholder group to discuss and report ideas to the Committee
- **CAGRD Replenishment Supplies** – Captured in first three issues plus part of collective approach to water supplies (LTWA Committee, etc.)
- **AMA Management Structure** – Address after looking at first three issues

An aerial photograph of a vast agricultural landscape. A multi-lane highway runs vertically through the center of the image. On either side of the highway are large, rectangular fields in various shades of green and brown, indicating different crops or stages of cultivation. In the foreground, there are some residential areas with houses and trees. In the far background, a range of mountains is visible under a clear sky.

Upcoming Meetings

Presentations plus Discussion of Ideas

- June 22nd – Groundwater in the Assured Water Supply Program
- August 10th – Unreplenished Groundwater Withdrawals
- September TBD – Hydrologic Disconnect
- GWAICC September – Committee Update on Solutions Development

Timeline

- October through December – Fine-tune most realistic, supported strategies and solutions
- GWAICC December Meeting – Present general-consensus proposals
- 2022 – Continue discussion to develop additional strategies and solutions

Assured Water Supply Program: Background and Pinal “Case Study”

Post-2025 AMAs Committee



*Ayesha Vohra, Deputy Counsel
Arizona Department of Water Resources*

*Jeff Inwood, Chief Hydrologist
Arizona Department of Water Resources
June 22, 2021*

Assured Water Supply Program: Background

Established by statute in 1980

- Rules adopted in 1995

Applies inside the Active Management Areas (AMAs) of the State

100-year Assured Water Supply demonstration is required for a subdivision plat approval and issuance of an Arizona Department of Real Estate public report.

Today's presentation is designed to provide an overview of the Assured Water Supply Program and not a comprehensive description of all assured water supply criteria.



Active Management Areas (AMAs)



Assured Water Supply Program: Guiding Principles

The Assured Water Supply program was designed **to provide consumer protection to homebuyers and to sustain the state's economic health by preserving groundwater resources and promoting long-term water supply planning.**



Assured Water Supply Determinations Required for Platting and Public Reports

1. A Certificate of Assured Water Supply: issued to the landowner for a proposed subdivision.
2. A Designation of Assured Water Supply: Issued to a municipal water provider for current, committed, and projected demands.

Assured Water Supply Criteria

1. Physical availability of water for 100 years.
2. Legal availability of water for 100 years.
3. Continuous availability of water for 100 years.
4. Sufficient water quality
5. Financial capability to construct the necessary water storage, treatment and delivery system for the full subdivision demand.
6. The groundwater supply must be consistent with the management plan for the AMA.
7. The groundwater supply must be consistent with the management goal of the AMA.



Assured Water Supply Criteria: Physical Availability

1. Physical availability of water for 100 years.
2. Legal availability of water for 100 years.
3. Continuous availability of water for 100 years.
4. Sufficient water quality
5. Financial capability to construct the necessary water storage, treatment and delivery system for the full subdivision demand.
6. The water supply must be consistent with the management plan for the AMA.
7. The water supply must be consistent with the management goal of the AMA.



Physical Availability of Groundwater

- To demonstrate physical availability of groundwater, an applicant must submit a hydrologic study using a **method of analysis approved by the Director** that **accurately describes the hydrology of the affected area**. R12-15-716(B).
- ADWR generally **requires a numeric groundwater flow model** and evaluates conditions across the modeled area.



Assured Water Supply Criteria: Consistency with Management Goal

1. Physical availability of water for 100 years.
2. Legal availability of water for 100 years.
3. Continuous availability of water for 100 years.
4. Sufficient water quality
5. Financial capability to construct the necessary water storage, treatment and delivery system for the full subdivision demand.
6. The water supply must be consistent with the management plan for the AMA.
7. The water supply must be consistent with the management goal of the AMA.

Groundwater Management Goals in the Active Management Areas (AMAs)

Phoenix, Prescott, and Tucson AMAs: attempt to achieve and maintain a long-term balance between the groundwater withdrawn and the groundwater recharged annually.

Pinal AMA: to allow development of non-irrigation uses and preserve the agricultural economy for as long as feasible, consistent with the need to preserve future water supplies for non-irrigation uses.

Santa Cruz AMA: to maintain safe-yield and prevent local water tables from experiencing long-term declines.

Assured Water Supply Consistency with Management Goal Requirement

Groundwater supplies to be included in a Certificate or Designation can meet the consistency with management goal requirement through:

1. extinguishment credits,
2. groundwater allowance, and/or
3. enrollment in the Central Arizona Groundwater Replenishment District (Central Arizona Water Conservation District).

Enrollment in the CAGRDR is a mechanism to demonstrate consistency with the management goal. **Membership in the CAGRDR does not demonstrate physical availability of groundwater.**



Key Assured Water Supply Groundwater Modeling Requirements

1. Must include the “total demand” of the modeled area which includes existing uses, issued unbuilt AWS demand, and the assured water supply applicant’s demand
2. Must remove long-term storage credits (LTSCs) not pledged to the assured water supply application
3. Depth to water at the end of the 100-year modeling period **cannot exceed** the following **depth-to-water limits or bedrock**, whichever is shallower:
 - a. 1,100 feet in Pinal AMA
 - b. 1,000 feet in Prescott, Tucson, Phoenix, Santa Cruz AMAs
4. Groundwater withdrawals **cannot create unmet groundwater demands or depth to water exceedances for previously issued assured water supply determinations** (including existing municipal demands).



AWS: Groundwater Modeling



Groundwater Models

Models present a simplification of reality
Creating the best representation of real-world conditions



<http://www.rossettiarchive.org>

Mona Lisa

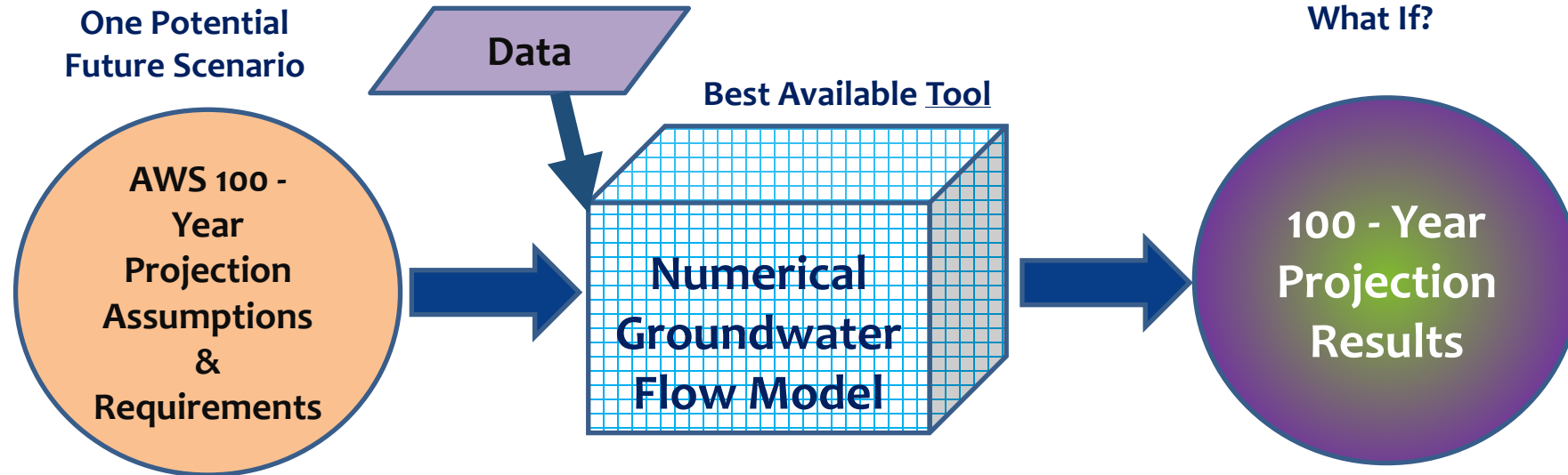


<http://farm2.static.flickr.com>

Lego Lisa

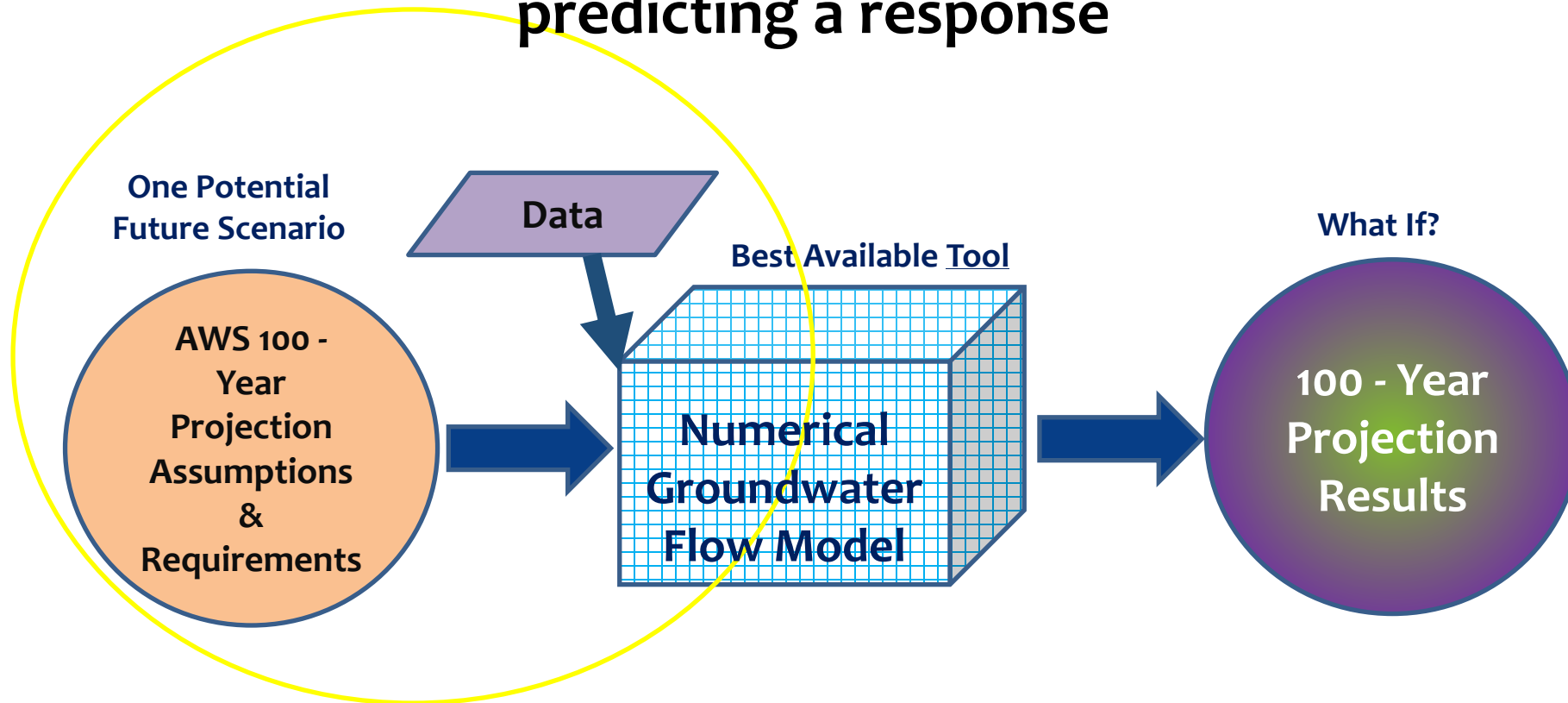
Assured Water Supply Modeling

A tool for understanding a hydrologic system and predicting a response

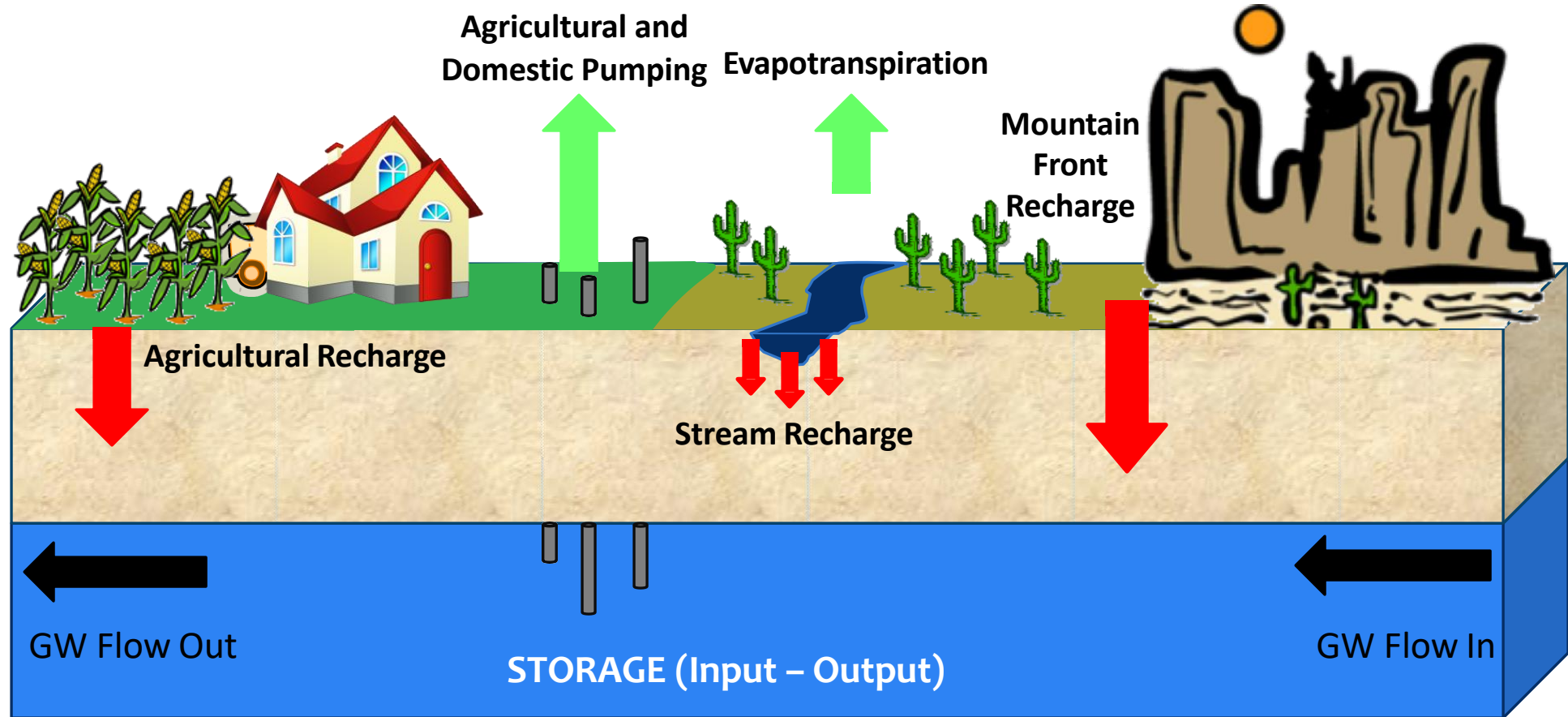


Assured Water Supply Modeling: Inputs

A tool for understanding a hydrologic system and predicting a response

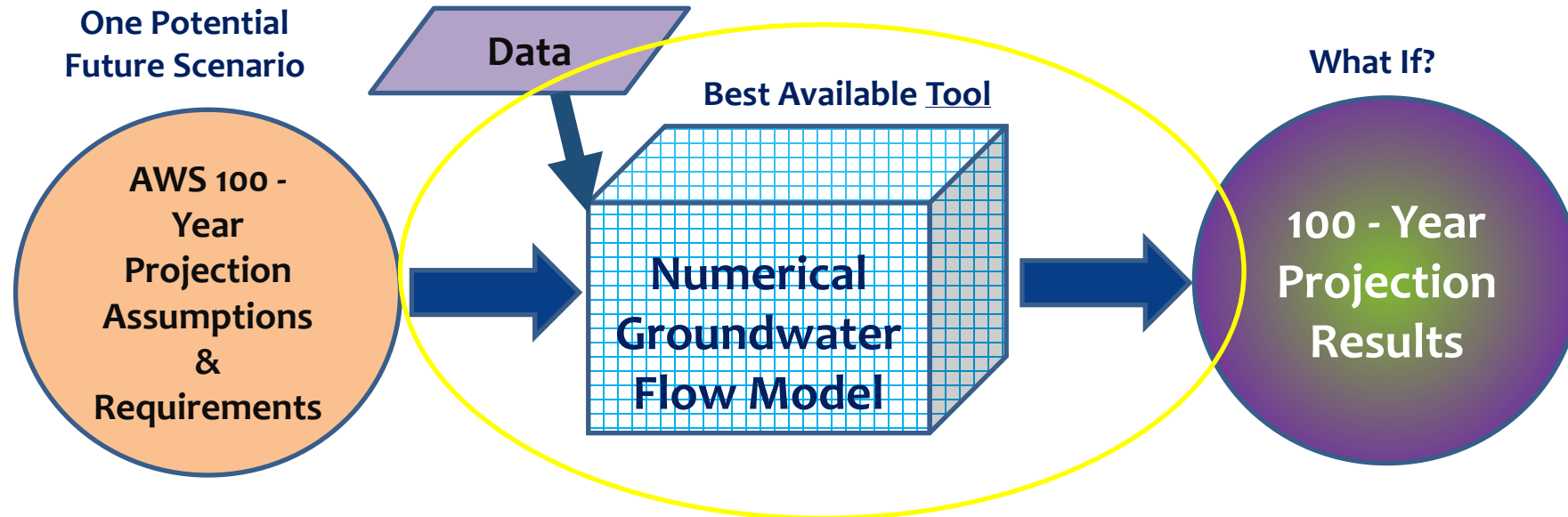


Modeling and Dataset Development

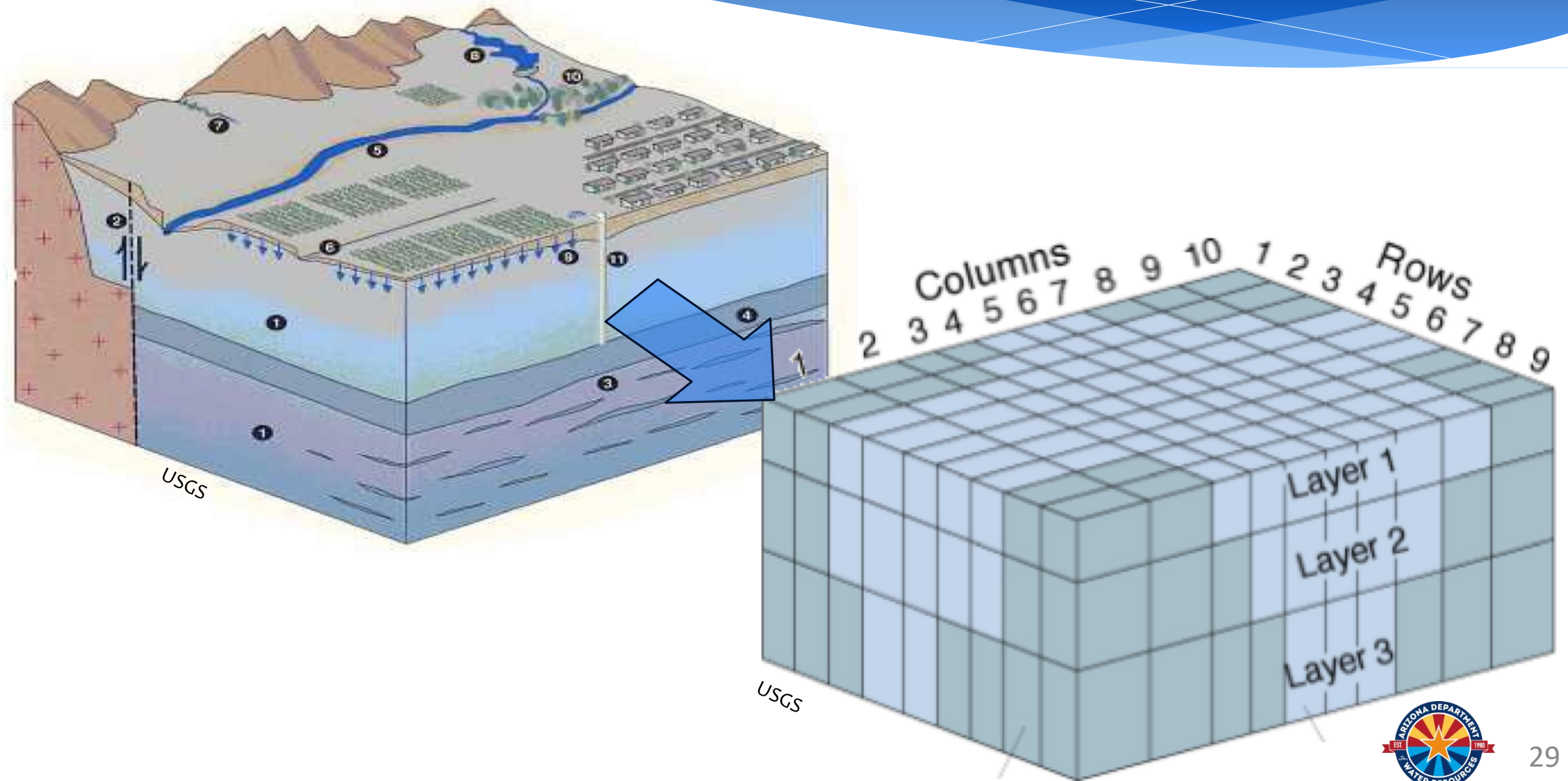


Assured Water Supply Modeling: Numerical Model

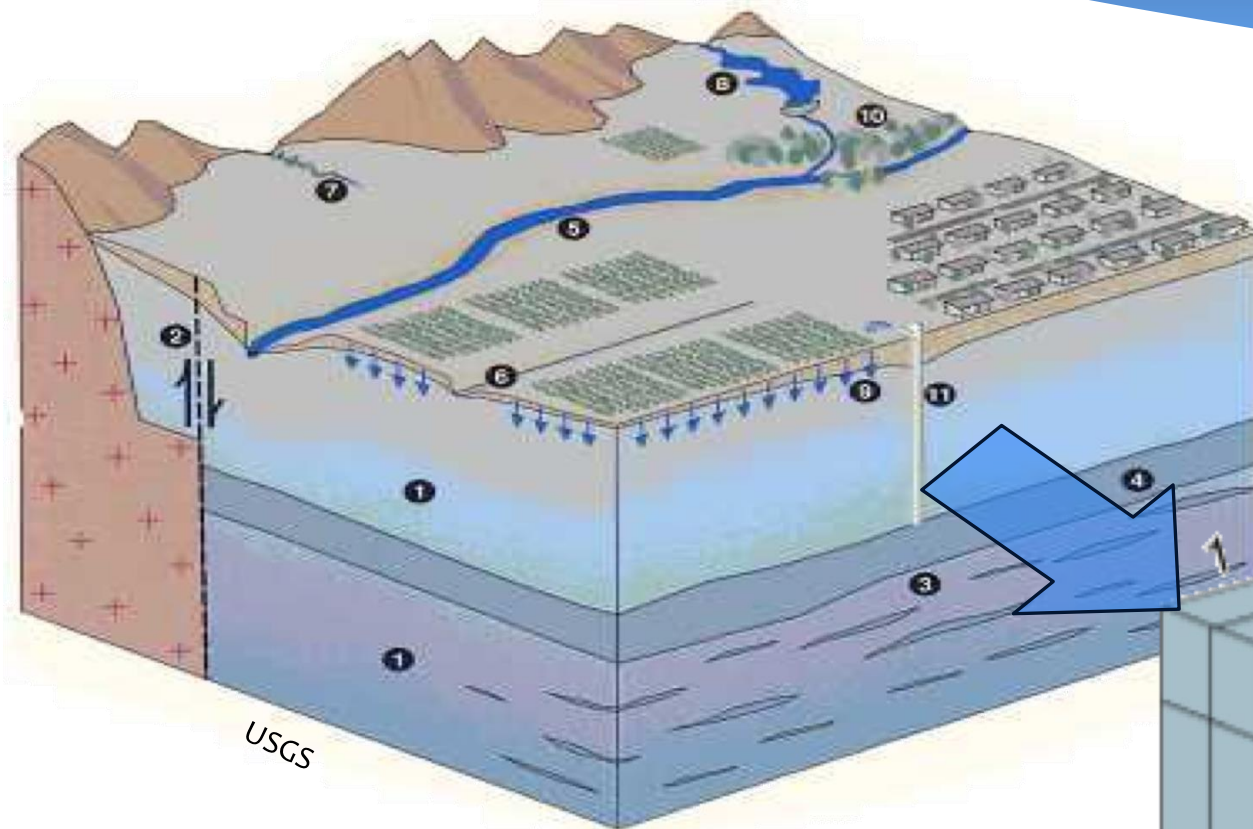
A tool for understanding a hydrologic system and predicting a response



Numerical Groundwater Model

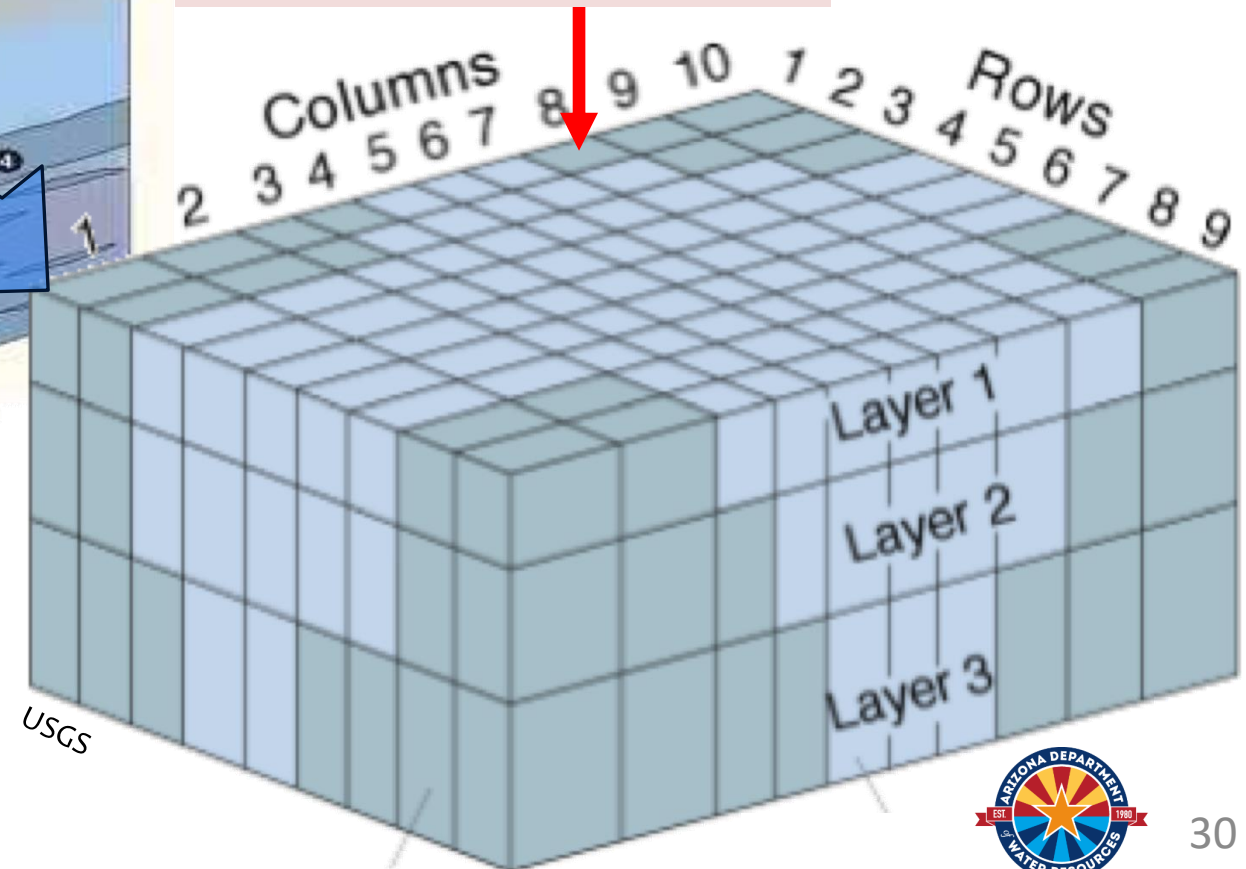


Numerical Groundwater Model



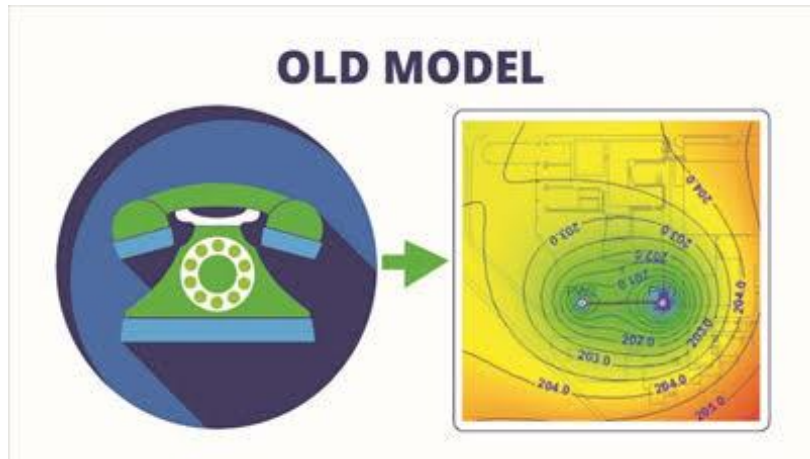
USGS

A model “cell”. Each model cell has its own unique hydrologic properties



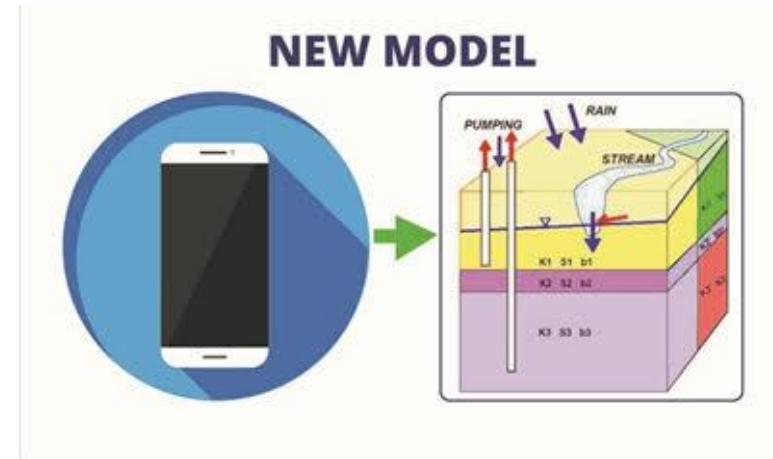
Numerical vs. Analytical Models

The Department **uses the best modeling tool available**, which enhances consumer protection



Analytical Models:

- More simplistic models
- Not calibrated
- Easier/faster to develop



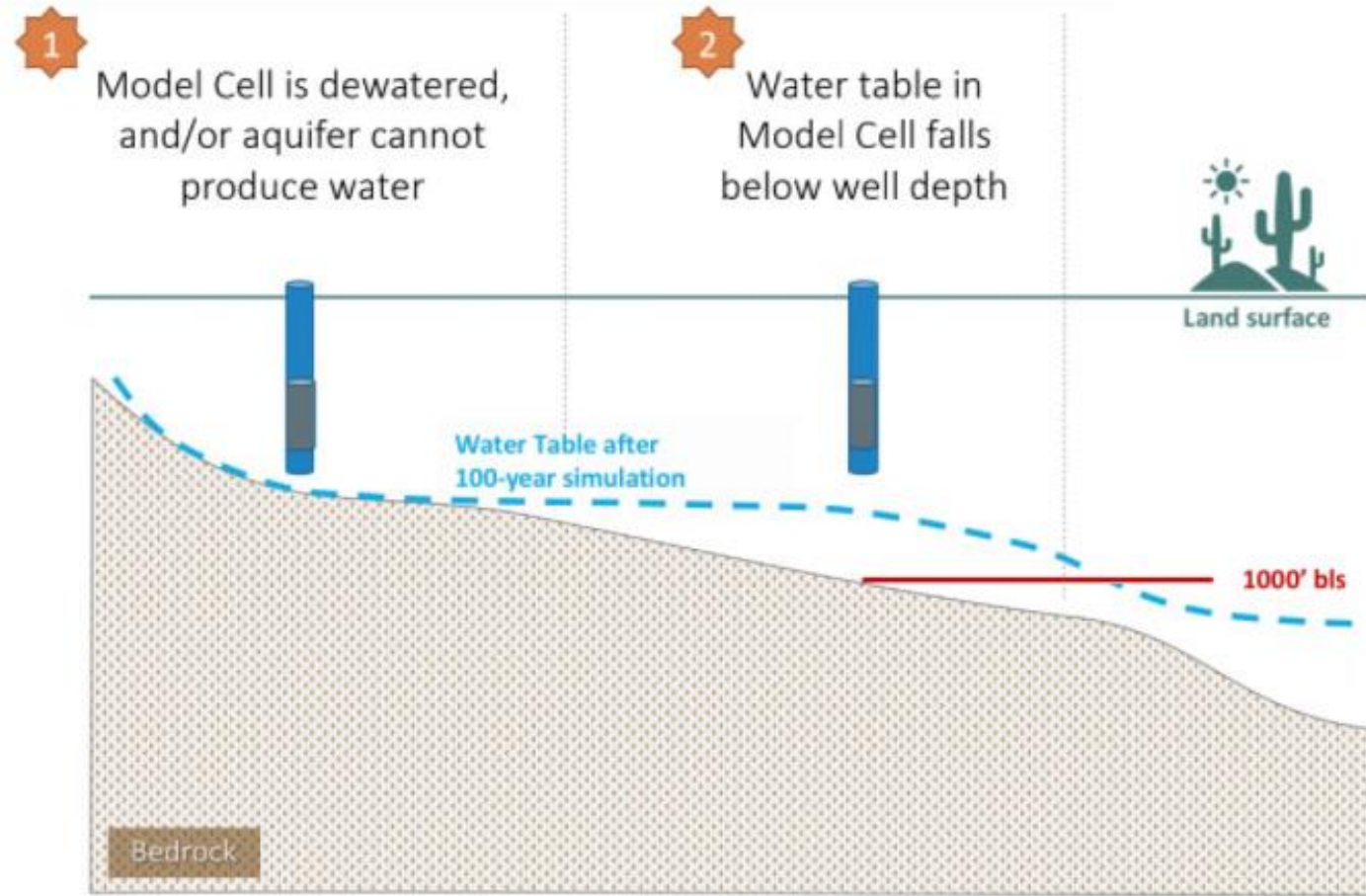
Numerical Models:

- Good for complex hydrogeologic systems
- Calibrated to observed/historic conditions
- Longer time to construct

Key Assured Water Supply Groundwater Modeling Requirements: Unmet Demands and Depth to Water Exceedances

1. Must include the “total demand” of the modeled area which includes existing uses, issued unbuilt AWS demand, and the assured water supply applicant’s demand
2. Must remove long-term storage credits (LTSCs) not pledged to the assured water supply application
3. Depth to water at the end of the 100-year modeling period **cannot exceed** the following **depth-to-water limits or bedrock**, whichever is shallower:
 - a. 1,100 feet in Pinal AMA
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4. Groundwater withdrawals **cannot create unmet groundwater demands or depth to water exceedances for previously issued assured water supply determinations** (including existing municipal demands).

Unmet Demands



adapted from AMWUA graphic

Pinal “Case Study”



History of Assured Water Supply Model Use for Applications

- **Prior to 2013 Assured Water Supply applicants submitted analytical and local numeric models.**
 - These models were the best available tools at the time
 - These models did not always consider regional conditions and demands
 - These models did not assess cumulative impacts across the entire modeled area or groundwater basin(s)
- **2014 – ADWR completed regional numerical groundwater model**
 - Regional modeled area includes the Maricopa-Stanfield and Eloy sub-basins

History of Assured Water Supply Model Use for Applications (cont.)

- **2019 – ADWR completed updated model and applied 100-Year Assured Water Supply Projection**
 - Projection is “deterministic” model run (one scenario)
 - One set of assumptions/inputs
 - Produces one set of results



2019 Pinal AMA Model: Projected Groundwater Demands By Use

AWS by Application Type	Projected* Groundwater Demand (AF)	% of Total Projected Groundwater Demand (AF)
Analysis (AAWS)	11,687,181	14%
Certificates (CAWS)	4,875,410	6%
Designations (DAWS)	4,886,490	6%
AWS Demands Subtotal	21,449,081	27%

Existing Uses By Sector	Projected* Groundwater Demand (AF)	% of Total Projected Groundwater Demand (AF)
Agriculture	48,573,365	60%
Municipal	2,005,524	2%
GRIC M&I	500,342	1%
Industrial	2,329,255	3%
Existing Uses Demands Subtotal	53,408,486	66%

Long-Term Storage Credit (LTSC)	Projected* Groundwater Demand (AF)	% of Total Projected Groundwater Demand (AF)
Existing LTSC	1,169,993	1%
Future LTSC	4,620,964	6%
LTSC Demands Subtotal	5,790,958	7%

**projected over 100-years (2016-2115)*



2019 Pinal AMA Model: Projected Groundwater Total Demand

Demand by Use	Projected* Groundwater Demand (AF)	% of Total Projected Groundwater Demand (AF)
AWS Demands Subtotal	21,449,081	27%
Existing Uses Demands Subtotal	53,408,486	66%
LTSC Demands Subtotal	5,790,958	7%
Total 100-year Projected Demand* (AWS + Existing Uses + LTSC)	80,648,525	100%

**total amount of water needed to meet projected demands*



2019 Pinal AMA Model: Total, Simulated and Unmet Demand

100-Year Total Groundwater Demand Projections 2019 Pinal Model <i>(Projected over 2016-2115)</i>	
Total 100-year Projected Demand* (AF)	80,648,525
Total Simulated Demand^ (AF)	72,560,695
Total Unmet Demand (AF) <i>(Total-Simulated)</i>	8,087,830

**total amount of water needed to meet projected demands*

*^total amount of water that can be produced by the model
to meet pumping demand*



2019 Pinal AMA Model: Unmet Demand, Portion By Use

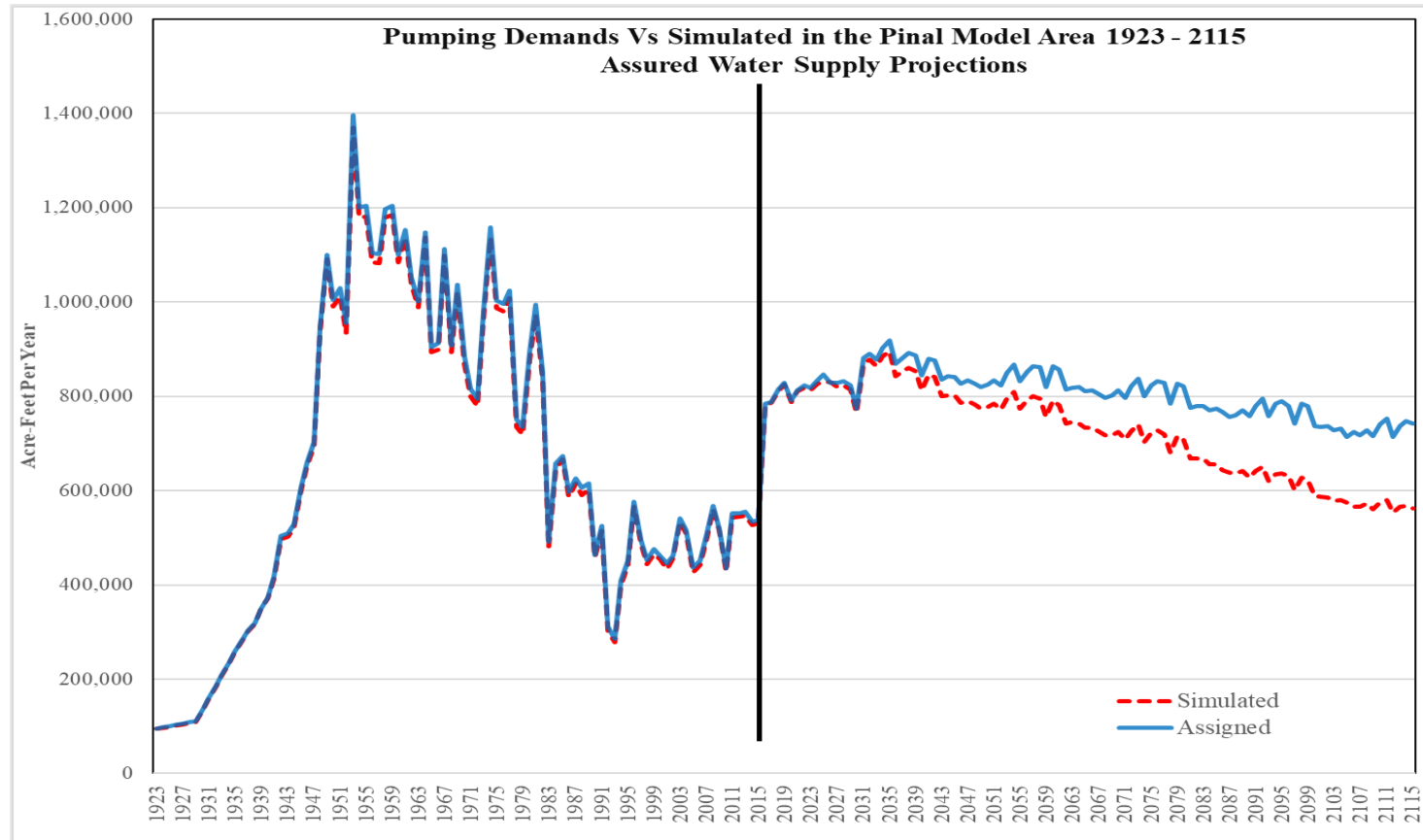
Total Demand (volume of all pumping demands) – **Simulated Demand** (volume of water that can be produced by the model to meet pumping demand) = **Unmet Demand**

Portion of Unmet Demand By Use (AF)	
AWS Unmet Demand (AF)	1,969,950
Agriculture Unmet Demand (AF)	5,059,056
Existing M&I Uses Unmet Demand (AF)	782,112
LTSC Removal Unmet Demand (AF)	276,712
Total Unmet Demand (AF) = 8,087,830	

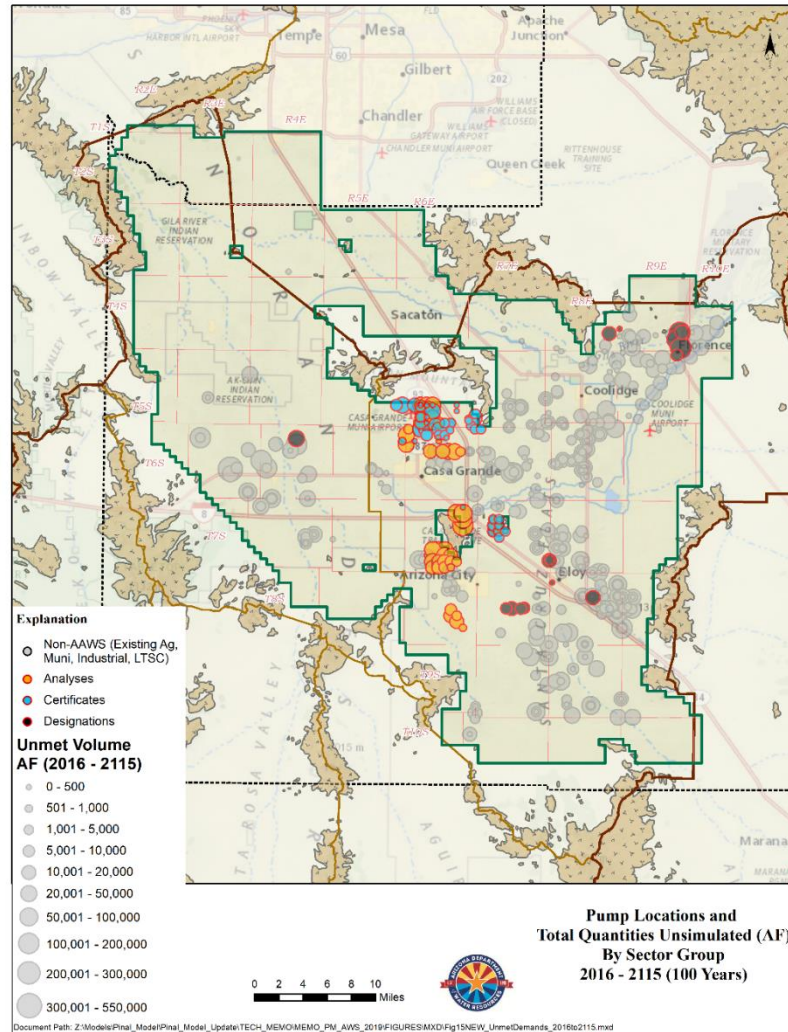


Model Results

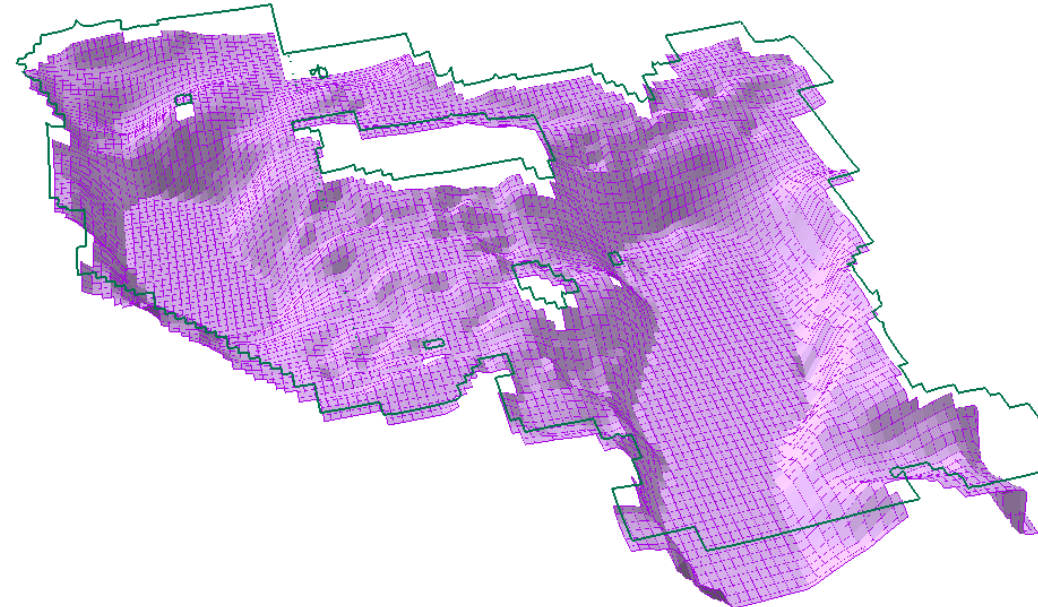
The model shows unmet demand in Pinal begins in the next 10-15 years



Locations of Unmet Demands

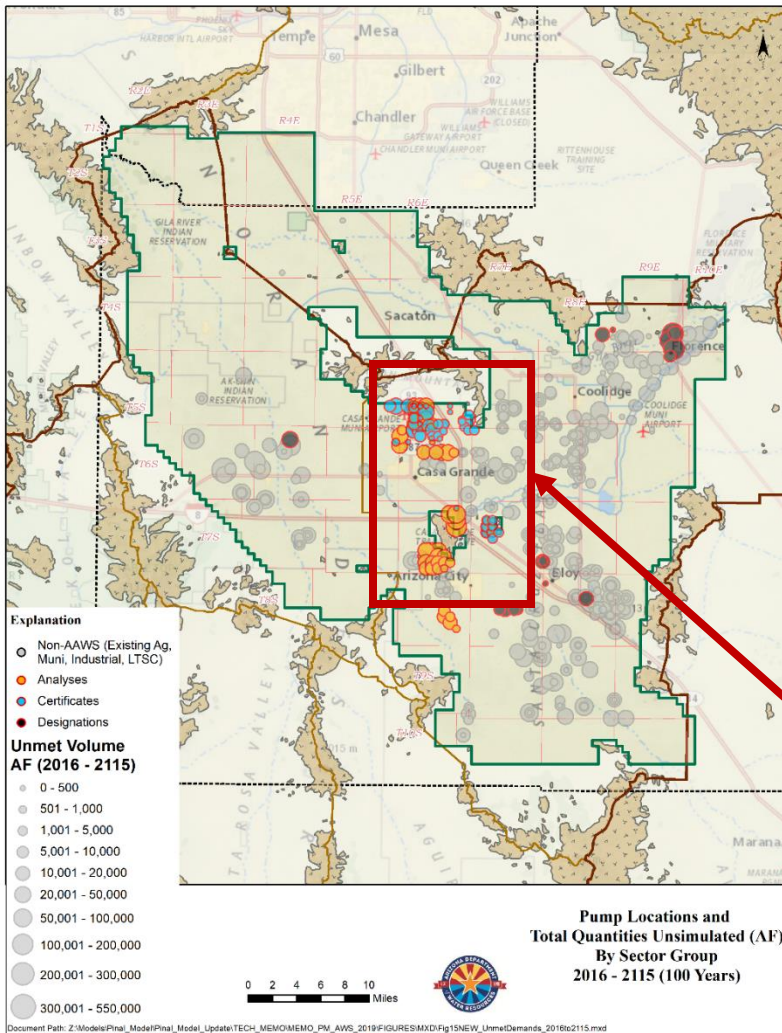


Model Bottom 3D Representation

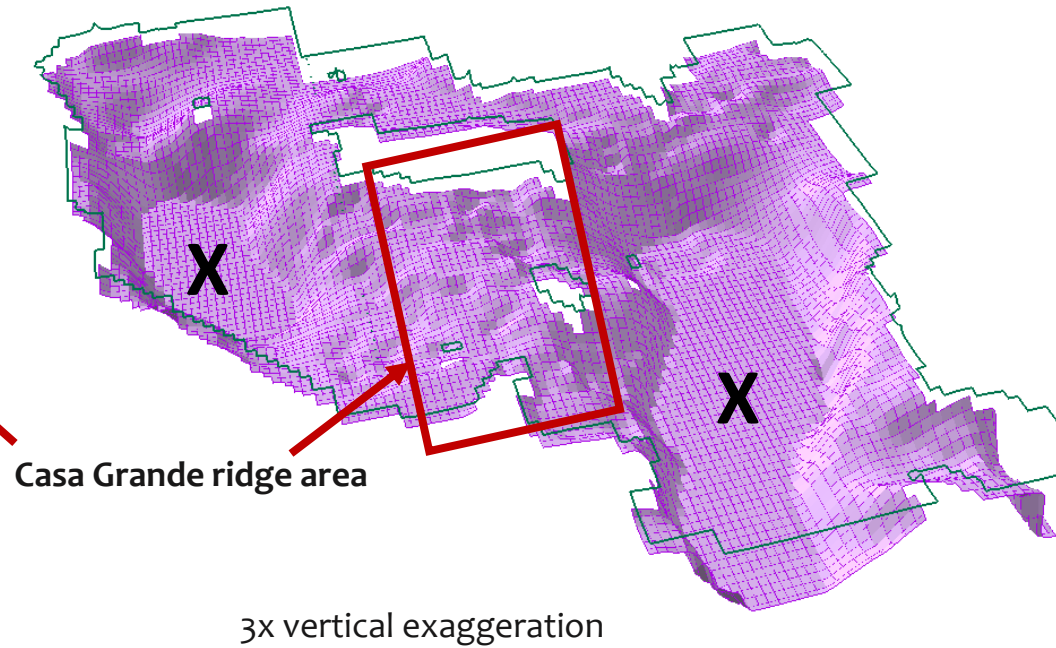


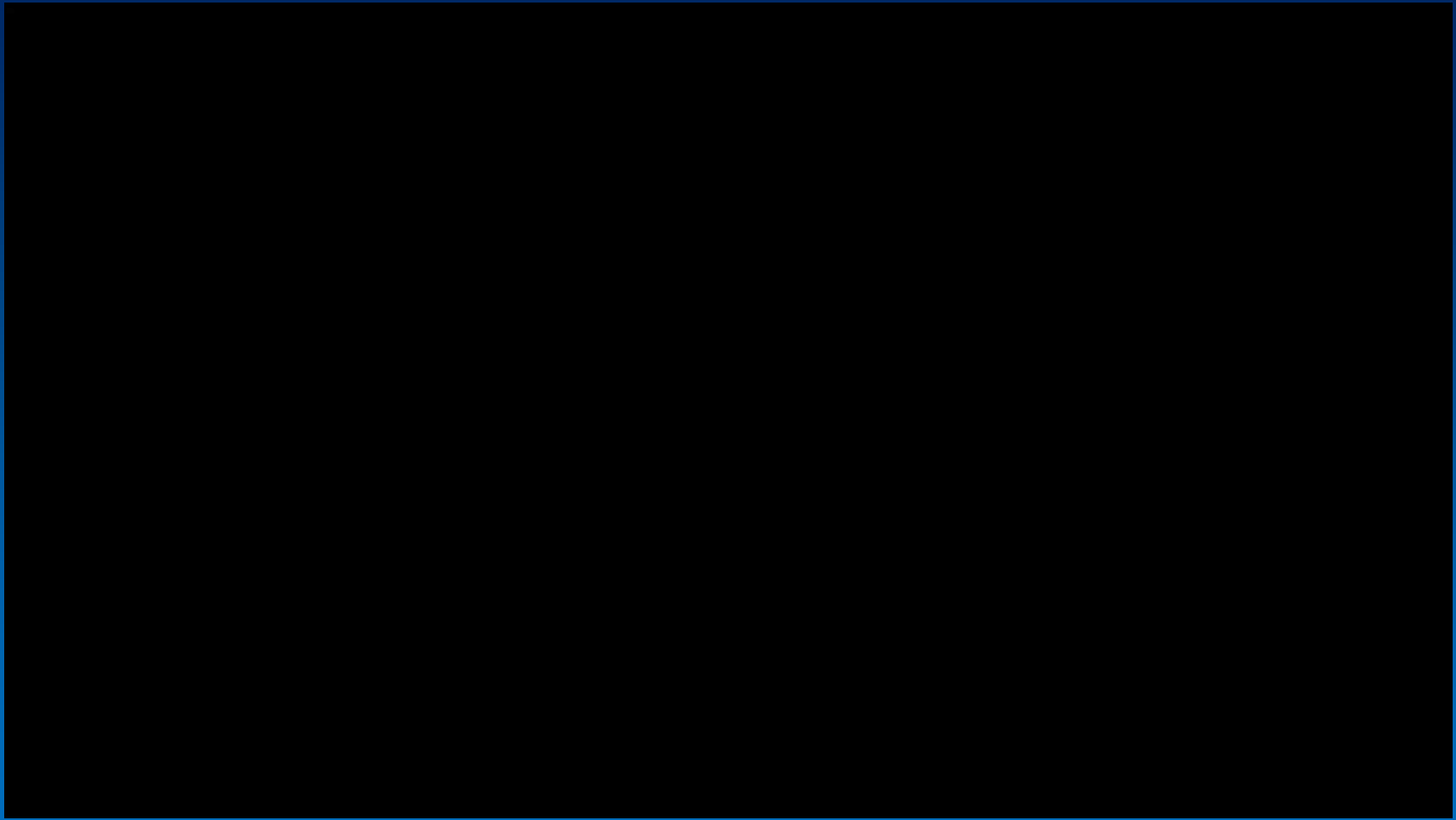
3x vertical exaggeration

Locations of Unmet Demands



Model Bottom 3D Representation





Groundwater is a Finite Resource

Groundwater in the AMAs has been allocated since the onset of the Groundwater Management Act in 1980. Groundwater is a finite resource. Therefore, **what has occurred in the Pinal AMA will occur in every other AMA in the future.**



The State's Guiding Principles to Assess Potential Solutions

We must continue Governor Ducey's commitment to upholding the consumer protection and water sustainability objectives of the Assured Water Supply Program.



Assured Water Supply Resources and Helpful Links

ADWR Assured Water Supply Webpage:

<https://new.azwater.gov/aaws>

Assured Water Supply Rules A.A.C. R12-15-701 – R12-15-729:

https://apps.azsos.gov/public_services/Title_12/12-15.pdf

Substantive Policy Statement: Hydrologic Studies Demonstrating Physical Availability of Groundwater for Assured and Adequate Water Supply Applications

<https://new.azwater.gov/sites/default/files/AssuredandAdequateWaterSupply-AWS7.pdf>

Substantive Policy Statement: Guidelines for Redistribution of Groundwater Pumping in Hydrologic Studies for Assured and Adequate Water Supply Applications

https://new.azwater.gov/sites/default/files/2019_10-28_AWS_8_Guidelines_for_Redistribution_of_Groundwater_Pumping_in_Hydro_Studies_for_AAWS_Applications.pdf

Questions?

Website:

www.new.azwater.gov

Twitter: @azwater



**PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY**



Discussion